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ABSTRACT

In order to test whether ghetto children would respond to a set of instructional materials that incorporate the language, the customs, and the general background of the disadvantaged student, a six week long course of study for seventh-grade general mathematics is developed. This course of study is then used in an experiment that employs nonstandard English to improve communications in mathematics. Subjects are members of two seventh grade general mathematics classes. Sixty-two students participated in the study -- 35 females and 27 males. Control and experimental groups are statistically the same for intelligence quotient scores, reading scores, and pretest scores on a standardized mathematics achievement test. The experimental group uses the 30 mathematics lessons developed for the study, while the control group uses a mathematics textbook. Both the experimental and the control group receive the Metropolitan Achievement Test -- Advanced Arithmetic as the posttest. After the posttest has been administered, the mean gain score for the experimental group is found to be 2.20 higher than the mean gain score of the control group. One of the major conclusions made from an analysis of the data is that a set of general mathematics problems designed specifically for the disadvantaged student can be written in nonstandard English if suitable precautions are taken. (Author/AM)

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The Use of Nonstandard English to Improve Communications in Mathematics

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The values of the teacher, the content of a given course, and the very purposes of education may well be appropriate for middle-class students but not for disadvantaged students. However, many urban ghetto children bring a language with them to the school that has its own linguistic structure and is definably different from the standard English spoken in the school.

It is strange that such children frequently have difficulty with the standard English commonly found in current classroom textbooks? Would these children respond to a set of instructional materials that incorporated the language, the customs, and the general background of the disadvantaged student? A course of study for seventh-grade general mathematics, six weeks in length, was developed. This course of study was then used in an experiment that employed nonstandard English to improve communications in mathematics.

The problems of the disadvantaged student are further compounded by the fact that their teachers have less training and less experience, relative to the teachers in other types of schools. Teachers must see their students as individuals who are capable of learning. All children (especially slum children) need praise and encouragement, coupled with success, just as middle-class children do. The teacher who discards the idea that inner-city students are inferior in ability can truly perform miracles because he believes they can learn. The teacher can translate his belief into positive action by challenging the mind, the spirit, and the will of each student.

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There are teachers and administrators who feel that the disabilities of most disadvantaged students are so intensive that they cannot be corrected. Too many teachers look upon the teaching of slow learners as a necessary evil in their early teaching career. These teachers look forward to the day when their seniority will permit them to advance to the teaching of only college-preparatory classes.

The students who served as participants in the study were members of two seventh-grade general mathematics classes at Prince Edward County High School in Farmville, Virginia. Ninety-six per cent of the student body was Negro. Although the seventh-grade had a total of one-hundred and forty-one, only sixty-two students participated directly in the study. There were sixty Negro participants and two white participants. Table I shows the distribution by race and sex of the participants. There were thirty-five female participants and twenty-seven male participants in the study.

Table I

Distribution by Race and Sex of the Participants

Race/Sex	Frequency
Negro Male	26
Negro Female	34
White Male	1
White Female	1
TOTAL	62

The students ranged in age from twelve to eighteen years, with the mean age being 14.22 years. Table II gives the distribution by age of the participants.

Table II

Distribution by Age of the Participants

Age (Years)	Frequency
18	1
17	4
16	10
15	12
14	8
13	20
12	7
TOTAL	62
Mean Age	14.22 years

The experimental group contained fourteen males and twenty-two females, one of which was white. The control group was composed of thirteen male students, one of which was white, and thirteen female students. Table III compares the experimental and the control group as to sex and race.

Table III

A Comparison Of The Experimental And The Control Groups By Sex And Race

Group	Males	Females	Negro	White
Experimental	14	22	35	1
Control	13	13	25	1
TOTAL	27	35	60	2

The variables used to describe the students were age, intelligence quotient, and reading score. The intelligence quotient had been measured by use of the Lorge-Thorndike Intelligence Test. The reading score had been measured by use of the Stanford Intermediate Achievement Test, Form W, Part II. Both tests had been administered during the month of April when the students were in the fifth grade. Table IV gives an overall description of the students who participated in the study.

Table IV

An Overall Description of the Students Who Participated in the Study

Group	Mean Male Age (Years)	Mean Female Age (Years)	Mean Male I.Q.	Mean Female I.Q.	Mean Male Reading Score (Years)	Mean Female Reading Score (Years)
Experimental	13.86	14.63	82.79	81.64	3.88	3.56
Control	14.69	13.38	80.00	84.85	3.79	4.02
MEAN	14.26	14.20	81.44	82.83	3.84	4.02

The two groups were shown to be statistically the same as far as intelligence quotient scores, reading scores, and pre-test scores on a standardized mathematics achievement test (Metropolitan Achievement Test--Advanced Arithmetic Test--Form A). The various t's were:

1. I.Q. scores, t=.12 (The t needed to reject the null hypothesis at the .05 level was 2.00).
2. Reading scores, t=29 (The t needed to reject the null hypothesis at the

.05 level was 2.05).

3. Pre-test scores, t=.37 (The t needed to reject the null hypothesis at .05 level was 2.00).

The experimental group used the thirty mathematics lessons which had been developed for the study. The control group used the textbook, First Book, Mathematics, Structure, and Skills by Richard A. Denholm and V. Dale Blank.

Procedure

Mathematics materials in the form of a six-weeks' course of study for seventh-grade basic general mathematics students were developed. The materials consisted of thirty daily lessons, each containing an oral and a written section. It was possible for the students to complete each lesson in a single class period.

The writer had intended to conduct this study in the Cincinnati Public School System. Permission was denied because a mathematics supervisor at the secondary level termed the study "too explosive". Next, the author attempted to conduct the study in the Richmond, Virginia Public School System. The Supervisor of the Mathematics Program denied permission because of the following reasons:

1. General mathematics classes are not necessarily composed of disadvantaged students.
2. The research is questionable.
3. Parents reaction to the course materials is unknown.
4. There should be no special program for disadvantaged students.
5. Schools should promote good English and should not join students in their slang.

Dr. Ronald Perry, Superintendent of Schools, Prince Edward County, Farmville, Virginia was receptive to the study and gave his support and approval to the project.

Since the nonstandard English (hip) terms had been selected and formulated with students from a downtown Cincinnati junior high school, it was reasonable to expect that not all of the terms would be known by students living in Farmville, Virginia. However, the words were validated by members of the control group with the following results:

1. Six terms (bad, pad, chinwarmer, hog, tie back, and deuce and a quarter) were known by less than 10% of the students.
2. Fifty of the seventy-three terms were known by thirty per cent or more of the students.
3. Thirty-one of the seventy-three terms were known by fifty per cent or more of the students.

The students in the experimental and the control groups were given the Metropolitan Achievement Test-Advanced Arithmetic Test--Form A as the pre-test. Form B of the same test served as the post-test. In addition to these tests each class had four fifty minute tests during the course of the experiment.

The thirty lessons were based upon the four fundamental mathematics operations, addition, subtraction, multiplication, and division. The materials also included problems involving place value, fractions, combining operations, and patterns in addition.

Each lesson to be taught on a given day was distributed to the students on that

day. The students were encouraged to keep each lesson and to review them from time to time and particularly prior to a test.

The purpose of each lesson was to reinforce the mathematical concepts presented in that lesson. Each lesson did give the student an opportunity to practice on some of the concepts and techniques previously acquired.

Some of the students did encounter a little difficulty reading the problems aloud during the oral portion of the lesson. The words they stumbled over were not the hip terms but standard English terms such as answer, gutter, mystery, raffle, camera, and focus.

Students in the experimental class did not have homework assigned. They were advised and urged to finish any unsolved problems from the day's lesson and also to correct any problem which they had not solved correctly. This was their only form of mathematics homework.

The control class functioned much like any normal classroom. That is, they used the regular textbook and conducted business like any normal general mathematics class.

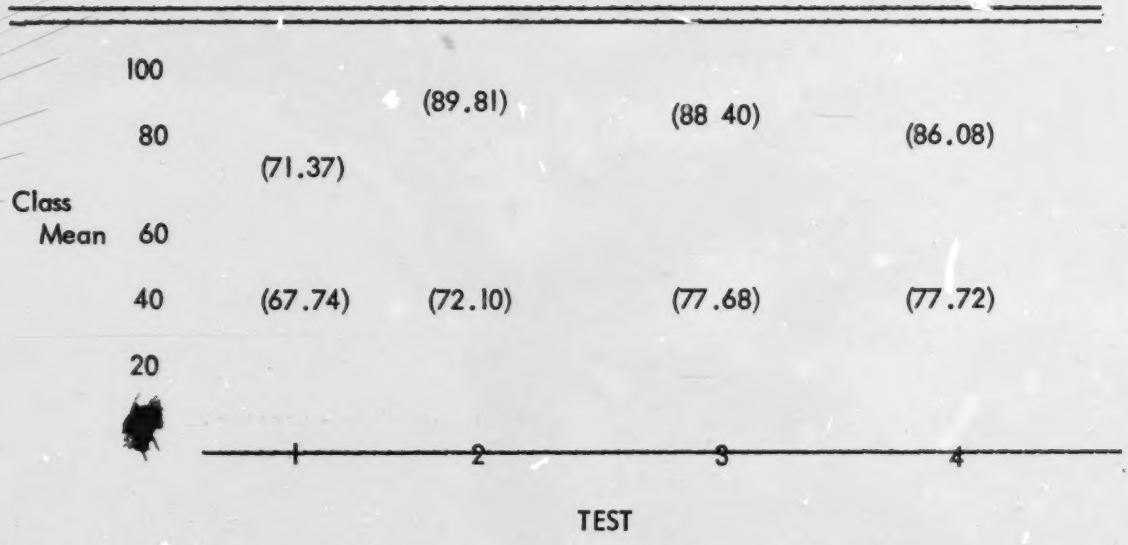
The control class was subjected to a greater volume of problems. The experimental class normally solved twenty-four to thirty problems each day. The control class normally would see forty or more problems during a single class period. For homework, the control class usually had twelve to twenty-five problems to solve. Homework was assigned twenty times during the period of six weeks.

Both the experimental and the control class were subjected to four hour long tests during the course of the study. The tests covered the same basic mathematical concepts.

The only difference was that the tests for the control group were written using standard English. Figure I shows a comparison of the four tests administered to the two groups.

Figure I

A Comparison of the Four Tests Administered to the Experimental and the Control Groups During the Course of Study



The differences between the mean scores of the two groups on the four teacher-made tests were:

1. Test 1 -- 3.63 points
2. Test 2 -- 17.71 points
3. Test 3 -- 10.72 points
4. Test 4 -- 8.36 points

These differences were all in favor of the experimental group.

RESULTS

Both the experimental and the control group received the Metropolitan Achievement Test-Advanced Arithmetic--Form B as the post-test. This test was administered immediately following the completion of the thirty lessons in the prepared unit of study.

Earlier it had been shown that the students in both groups were statistically the same as far as intelligence quotient scores, reading scores, and pre-test scores on a standardized arithmetic test. After the post-test had been administered, the mean gain score for the experimental group was found to be 2.20 points higher than the mean gain score of the control group. The gain score for each participant was computed by subtracting his raw score on the pre-test from his raw score on the post-test. The question to be answered was: "Is there a significant difference between the two means?" To answer this question a t-test was employed.

Table V presents the comparison of the gain score means of the experimental and the control groups by use of the t-test.

Table V

A Comparison of the Gain Score Means of the Experimental And The Control Groups by the Employment of a t-Test.

Group	Number	Mean	Standard Deviation	Variance	t
Experimental	36	5.89	7.06	49.85	1.51*
Control	26	3.69	4.45	19.82	

*Not significant at the .05 level of significance. A t of 2.00 was needed for significance at the .05 level. The t = 1.51 was significant at the .12 level of significance.

The gain score mean for the experimental group was 5.89 and the gain score mean for the control group was 3.69. Computation yielded a t = 1.51, which was not significant at the .05 level of significance. The t, at the .05 level of significance, required to reject the hypothesis that there was no difference between the two means was 2.00. Thus, the two gain score means for the experimental and the control groups were not statistically different.

Gain scores were utilized to help control for the pre-existing within group differences in ability that existed despite the fact that the two groups were statistically not different with respect to three variables: intelligence quotient scores, reading scores, and pre-test scores on a standardized arithmetic test. The correlation between the pre- and post-test scores was high. It was .739 for the experimental group and .924 for the control group.

Conclusions

The following represent the major conclusions made from an analysis of the various data obtained from the study:

1. There was general agreement upon the seventy-three nonstandard English words around which the thirty daily lessons for the experimental group were written.
2. A set of general mathematics problems designed specifically for the disadvantaged student can be written in nonstandard English if certain precautions are taken. These include obtaining a valid set of nonstandard English words, working closely with a group of disadvantaged students to

insure that the terms used in the various problems are genuine and well known, and using current information about disadvantaged students to incorporate the customs and the general background of the disadvantaged student along with his language in the mathematics problems.

3. The employment of nonstandard English as a vehicle to improve communications in mathematics for disadvantaged students will not adversely affect the mathematics achievement of the student.

4. The use of daily mathematics lessons which contain an oral and a written portion can be utilized to give the disadvantaged student success on a daily basis.

5. The use of nonstandard English in a classroom of predominantly Negro students will not cause dissension and disharmony among the students or the parents of the students. The instructor received no complaints, letters, or telephone calls from any students or parents.

6. The use of mathematics materials written in nonstandard English which also incorporate the customs and the culture of the disadvantaged student can be used as effectively as a standard general mathematics textbook in the teaching of general mathematics to disadvantaged secondary school students.

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